Sandia National Laboratories
Primary Hazard Screening (PHS)

PHS Number: SNL08A00071-003

Integration Lab Parts Clean Room 1511

I. Signatures (Electronic signature dates shown)

Risk Management Determination

Hazard Classification: **Low**

Required Documentation: **PHS with integral HA**

Facility/Project Designator: **Non-nuclear Facility**

Date Created: **01/15/2010**

DOE Order References: **425.1C**

Results as of: **02/24/2010**

Activity-level PHS: **N**

Author / Technical Review:

I am knowledgeable of the activities and hazards covered by this PHS and, after doing due diligence, the description, notes, identified hazards, analyses, and other information contained in this PHS are complete and accurate.

Author : **Nogan,John** Org: **01132** **02/23/2010 15:29:59**

The description and notes describe and scope the activities performed under this PHS. All hazards have been identified. Questions are answered correctly and, as necessary, rationale or clarification is provided. All hazards in the HA have been analyzed, including the identification of controls for each hazard. I have performed the above reviews and concur that those items are complete and accurate.

ES&H Coordinator : **Starr,Michael** Org: **01131** CONCUR - **02/23/2010**

Quality Review:

This PHS meets minimum Corporate standards for 1) description/notes and 2) required information. There are no gross inconsistencies. I have performed the above reviews and concur that those items are complete and accurate.

PHS Team : **Costanzo,Jessica Amoret** Org: **04126** CONCUR - **02/24/2010**

Approver:

The description and notes describe and scope the activities performed under this PHS. All hazards have been identified. Questions are answered correctly and, as necessary, rationale or clarification is provided. All hazards in the HA have been analyzed, including the identification of controls for each hazard. I have reviewed this PHS and concur that its contents are accurate and complete. I will ensure that the requirements and commitments in this PHS are implemented prior to the start of work.

Approving Manager : **Hearne,Sean J.** Org: **01132** APPROVE - **02/24/2010**

II. PHS Purpose, Limitations, and Use in Work Planning and Control

Purpose of the PHS

For the scope of work identified, the PHS identifies:

- High-level (primary) hazards (e.g. chemicals, toxic gasses, explosives)
- Some, but not all controls (e.g. PPE, respirators, ventilation, lockout/tagout, and NEPA), please see the limitations section, below for additional information.
- A Hazard Classification, which determines the requirements for additional Safety Basis documents [e.g., Hazard Analysis (HA), Safety Assessment (SA), Safety Assessment Document (SAD), Documented Safety Analysis (DSA) etc.]
- For the hazards and controls identified, the PHS enables the identification and communication of:
  - Requirements documents (such as ES&H Manual chapters, sections, and supplements) that must be reviewed to determine specific requirements applicable to the work
  - ES&H Manual-required training
  - Action and Warning messages that highlight key requirements.

The Hazard Analysis section of the PHS is used to perform a high-level hazards analysis and controls selection for hazards with a Hazard Classification of 'Low' and, optionally, for Standard Industrial Hazards (SIH).

Limitations of the PHS for Use in Activity-level Work Planning and Control

Unless additional information is specifically added, a PHS **does not** contain all of the detail necessary to identify and control hazards at the activity/task level. The reasons for this include:

- PHSs are typically written at the project or work-area level and therefore, do not contain sufficient detail about individual tasks or the hazards/controls associated with them.
- While the PHS provides requirements for the hazards and controls identified, it **does not** provide a comprehensive list of all requirements in the ES&H Manual and related documents. Furthermore, many of the requirements are identified by reference to sections of the ES&H Manual, which must be evaluated for requirements applicable to the specific work being performed.
- It is impractical to ask enough questions to generate the level of detail necessary for activity/task-level hazard identification and control; human analysis must be employed. Consequently, details must be developed by a work planner, including:
  - Specific details about the hazard (e.g. what chemical, which laser, when, under what conditions, and where)
  - Other controls needed, since the only controls automatically identified are the ones with ES&H Manual requirements that result from their use. Important controls, such as access control, interlocks, shielding, monitoring, and personnel qualifications are not identified.
  - Specificity about controls (e.g. type of PPE, ventilation specifications)
  - Details on how and when you implement each control
  - Information on who needs to take what training

Recommended Use of the PHS to Support Activity-Level Work Planning & Control

The information developed in the PHS and any resultant Safety Basis documents should be utilized when performing the subsequent task of activity-level hazard identification, analysis, and control selection, where (1) the major work steps are identified; (2) the hazards associated with each major step are identified and analyzed; and (3) the controls for each hazard are identified and verified to be adequate to protect the involved workers. For the vast majority of work performed at Sandia, the Job Safety Analysis form (SF 2001-JSA) or equivalent is the recommended tool to use for this purpose. The JSA provides a systematic process for a team of involved workers and SMEs to ensure the activity-level work scope is rigorously analyzed to identify all potential hazards and specify appropriate controls for each hazard. Information from the PHS and Safety Basis documents is used as an input in developing the JSA, and the results of the JSA are used to develop TWDs, procedures, or other work instructions as appropriate.

In some cases, the PHS system may be used for activity level hazard identification, analysis, and controls identification, however, the PHS usually must be supplemented with additional information to provide the level of detail necessary to serve this purpose. In these cases, a PHS should be designated as an "Activity-Level PHS" on the PHS General Information page; however, these PHSs will be reviewed during the review and approval process to confirm that they contain the detail necessary to identify the hazards and controls at any stage of the work being performed. If determined to not be adequate, options include (1) revising the PHS to include adequate information; or (2) removing the "Activity-Level PHS" designation, and using a JSA/JSA-equivalent process to perform activity-level hazard identification, analysis, and control selection.

III. Table of Contents

IV. General Information

Document Status

Question Set Version: **I**

Status: **APPROVED** Expiration Date: **02/24/2011**

Responsible Organization: **01132**

Radiological Protection Level for this facility or project: **None**

Description

The integration lab parts clean room houses tool that act in support of the integration lab activities and is a class 10,000 cleanroom. Systems located in that room include a HEPA filtered bead blasting system attached to the house exhaust. The system is for cleaning of shielding of the e-beam evaporator systems, sputter system, chemical vapor deposition which are typically coated with Au, Al, Cu, Ti, Cr, SiN, Si and SiO2. The room also contains a base and a solvent fume hood, which will be used for degreasing and etching of parts for use in the cleanroom. There are wafer dicing saws used for dicing of wafers from the integration lab, e.g. Si wafers, SiC, and sapphire as well as a lapping tool. The parts clean room also has a probe station used for performing analysis on micro-devices fabricated in the integration lab.

Notes from Document or Interview

General Document Notes

Locations

Primary Location

Site : **SSTP** Area : **No Tech Area** Bldg : **518** Room : **1511**

Other Locations

None Entered

Responsible Organization History		
Organization Number	**Effective (Starting) Date**	**This Org. Submitted Document for Review**
01132	02/19/2008	Y

V. Identified Hazards

Hazard Name	Hazard Description	Source (Question or Table)
traffic related hazards	traffic related hazards for injury	Required by general corporate business process
common electrical hazards	common electrical hazards	Required by general corporate business process
Use or storage of chemicals	Potential personnel exposure to chemicals & fire protection regulatory requirements	QUESTION 5
Unevaluated chemical use	potential chemical overexposure	QUESTION 5a
Noncompliant storage, dispensing, or use of flammable/combustible liquids could cause fire/explosion.	fire/explosion hazard	QUESTION 5h
Exposed and energized electrical circuits	potential electrical shock or arc	QUESTION 6a
Circuit Breakers or disconnect switches at 50 V or more	potential electrical arc from operating circuit breakers or disconnect switches	QUESTION 6b
Electrical equipment operating at 50V or greater that is not NRTL-approved	unknown hazard potential since items have not gone through the standards, testing rigor, and hazard analysis associated with an NRTL-evaluation	QUESTION 6d(1)
Standard industrial mechanical hazards	potential injury from mechanical forces	QUESTION 7
Portable power tools	potential injury from portable power tools	QUESTION 7b
Standard industrial pressure hazard(s)	Injury or damage	QUESTION 10
Environmental concern below LOW hazard classification requirements.	potential for regulatory action	QUESTION 15
Wastewater discharge, SIH hazard	potential to exceed permitted amounts	QUESTION 15a
General Wastewater discharge, SIH hazard	potential to exceed permitted amounts	QUESTION 15a(1)
Air discharge, SIH hazard	potential to emit regulated contaminants	QUESTION 15b
Regulated chemicals	potential to emit regulated contaminants	QUESTION 15b(3)
Hazardous Wastes	potential for regulatory action	QUESTION 15d
Unevaluated hazards	hazards that may require PPE	QUESTION C2a

VI. Required Actions

Off-Site Requirements:

NONE
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Warning Messages:

1. There are a variety of requirements applicable to chemicals. Refer to the portions of MN471001 ES&H Manual relevant to the activities being performed for requirements. **Comment added: Requirements in Corporate Procedures ESH100.2.IH.1 Maintain a Workplace Free from Chemical, Physical, Biological, and Safety Workplace Hazards, ESH100.2.IH.4 Evaluate and Control Chemical Hazards have been implemented are adhered to by personnel.** (QUESTION 5)
2. Any activity inside the Limited Approach Boundary is considered working near energized parts and requires a senior-manager-approved technical work document (TWD). (QUESTION 6a)
3. All operators of the system must be qualified according to the requirements of the Pressure Safety Manual. The Pressure Operator Qualification Form (SF 2001-PQF) is available as an optional tool for documenting the applicable training and qualification requirements for pressure applications. See MN471000, Pressure Safety Manual, Chapter 2, "The Pressure Safety Program," for requirements and guidance on qualification of pressure operators. **Comment added: Personnel have completed the necessary training for operating pressure systems.** (QUESTION 10a)
4. There may also be requirements for waste minimization and documentation of waste minimization efforts/results. Contact the Pollution Prevention Team for assistance with waste minimization. **Comment added: Requirements for waste minimization and documentation of waste minimization efforts/results are implemented as necessary.** (QUESTION 15d)
5. 10 Code of Federal Regulations Part 851, Worker Safety and Health Program (PG470246), as implemented through various Sandia requirement documents (e.g., Corporate Policy ESH100, Environment, Safety and Health), requires a workplace hazard assessment to determine if hazards are present, or likely to be present, which necessitate the use of personal protective equipment. **Comment added: IH will be contacted to evaluate the current usage of PPE in these operations and any additional requirements will be implemented by personnel.** (QUESTION C2a)

Action Messages:

1. Contact the Industrial Hygienist on the appropriate Division ES&H Team to evaluate exposure to chemicals and determine control measures, prior to working with chemicals . **Comment added: The IH Customer Support Team will be contacted to evaluate the current operations involving the use of chemicals.** (QUESTION 5a)
2. Refer to "Log of Consultation," with a subject of, "Storage, Dispensing, Bonding, and Grounding of Flammable and Combustible Liquids." Contact Fire Protection Engineering for assistance. See the ES&H Direct Access Services List. **Comment added: The requirements in the "Log of Consultation" will be implemented as needed.** (QUESTION 5h)
3. Work on energized electrical circuits is restricted to certain individuals. Ensure only qualified personnel perform work on electrical equipment/systems at SNL. It is the responsibility of the department manager to determine an employee's electrical qualifications. To become qualified to perform electrical work a person shall do the following:
Demonstrate a familiarity, through interview, demonstrated experience (i.e., resume/review) or direct observation, with the hazards of the workplace and the specific equipment to be worked on, as well as any associated ES&H Standard Operating Procedures (SOPs) and Operating Procedures (OPs).
Demonstrate a familiarity, through interview, demonstrated experience (i.e., resume/reference) or direct observation, with electrical maintenance techniques, codes, and other general electrical knowledge.
Have qualifications reviewed and approved by their department manager to ensure they are qualified for a particular job assignment.
NOTE: A person qualified to work with certain equipment may be considered "unqualified" to work on similar equipment without first being advised of any differing hazards involved. (QUESTION 6a)

4. Use a technical work document (TWD) to perform energized work as follows: If the energized work is diagnostic (such as troubleshooting, measuring voltage, etc.), an OP is required. You can find an example of a completed energized electrical OP on the Electrical Safety homepage. This could easily be used as a template for any R&D electrical activity. If the work involves manipulation or reconfiguration of an energized component, an Energized Work Permit (EWP) must be completed. A EWP is needed each time such tasks are to be completed. An EWP may be obtained from the SNL internal web under Corporate Forms EWP-SF2005-EWP (10-2005). (QUESTION 6a)
5. The energized work decision tool shall be used to determine PPE and hazard analysis requirements. Prior to PPE use, workers shall receive site-specific PPE training. See MN471001, ES&H Manual, Section 4L, "Personal Protective Equipment (PPE)" for requirements and guidance regarding site-specific PPE training. See MN471004, Electrical Safety Manual, Chapter 2 "General Requirements," "2.10 Personal Protective Equipment," for requirements and guidance. (QUESTION 6a)
6. Identify PPE, shock approach, and arc flash boundary prior to operating disconnect switches. In addition, personnel must be trained on safe switching techniques/hazards. See MN471004, Electrical Safety Manual, Chapter 2, "General Safety Requirements," sections: "2.1 Electrical Work Requirements - General," "2.2 Qualifications and Training," and "2.10 Electrical Personal Protective Equipment" for requirements and guidance. (QUESTION 6b)
7. All electrical equipment that is not NRTL-listed must be evaluated by an authorized equipment inspector. Contact your ES&H Coordinator for additional information on equipment inspections or to identify an authorized equipment inspector. (QUESTION 6d(1))
8. In California, Contact the Air SME if any of the chemicals being used are listed on the Toxic Air Contaminants Table. **Comment added: No action required. Operations take place at SNL/NM.** (QUESTION 15b(3))
9. As required by the ES&H Manual, Section 19A, "Hazardous Waste Management," Members of the Workforce who are owners or generators of hazardous waste **shall plan** how to control hazards and appropriately manage their hazardous waste. **Comment added: Requirements in Corporate Procedure ESH100.2.ENV.22 Manage Hazardous Waste at SNL/NM are followed by personnel.** (QUESTION 15d)
10. Contact the appropriate Division ES&H Team member to conduct a workplace hazard assessment for PPE requirements. This assessment must be completed prior to new or revised work with hazards that might require PPE. **Comment added: IH will be contacted to evaluate the current usage of PPE in these operations and any additional requirements will be implemented by personnel.** (QUESTION C2a)
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Required Training

[Note: This training is a regulatory requirement for one or more people involved in operations associated with identified hazards. Each class may not be required by all people working in the area.] Please note that some training classes are only provided occasionally. Please be sure to allow adequate lead-time for personnel to schedule and complete training.]

Course Code	Course Title	Exclusions	Training Interval (Years)	One-time Training
ELC106	R&D ELECTRICAL SAFETY (> 50 VOLTS)	ELC106, unless not required by the energized work decision tool	--	Yes
ELC106R	R&D ELECTRICAL SAFETY REFRESHER (> 50 VOLTS)	unless not required by the energized work design tool.	3	No

Course Code	Course Title	Exclusions	Training Interval (Years)	One-time Training
ELC901	SAFE SWITCHING BRIEFING		--	Yes
ENV112	HAZARDOUS WASTE & ENVIRONMENTAL MANAGEMENT TRAINING	(all locations other than SNL/CA will take ENV112)	1	No
ESH100	ES&H AWARENESS		1	No
ESH200	SAFETY MANAGEMENT		--	Yes
HAZ101	EMPLOYEE BASIC HAZCOM	LAB100 is acceptable for emergency response activities, if already completed	2	No
HAZ103	SITE-SPECIFIC HAZCOM		2	No
LAB100	LABORATORY STANDARD INFORMATION AND TRAINING	LAB100 (HAZ101 is acceptable if already taken)	2	No
LAB103	SITE-SPECIFIC LABORATORY SAFETY TRAINING		2	No
PRS150	PRESSURE SAFETY ORIENTATION	for all operators of the system	--	Yes
PRS150R	PRESSURE SAFETY ORIENTATION REFRESHER		3	No

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Regulatory Requirements

Regulatory and Standards Drivers for this Facility or Lab:
[Note: ES and H Manual sections listed below contain requirements and guidance that pertain to the hazards you have identified in this PHS. It is your responsibility to ensure these requirements have been fulfilled.]

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1. (QUESTION 5) MN471001, ES&H Manual, Section 6D, "Hazard Communication Standard," and Section 6E, "Laboratory Standard - Chemical Hygiene Plan"
2. (QUESTION 5) MN471001 - ES&H Manual, Section 6E, Laboratory Standard - Chemical Hygiene Plan
3. (QUESTION 5) MN471001, ES&H Manual, Section 6U, "Hazardous Material (Chemical and Biological) Inventory"
4. (QUESTION 5h) MN471001, ES&H Manual, Section 5A, "Fire Protection Requirements"
5. (QUESTION 6a) MN471001 - ES&H Manual, Section 4L, "Personal Protective Equipment (PPE)" for requirements and guidance regarding site-specific PPE training
6. (QUESTION 6a) MN471004 - Electrical Safety Manual, Chapter 2 "General Safety Requirements," 2.10 "Electrical Personal Protective Equipment," for requirements and guidance
7. (QUESTION 6a(2)) MN471004 - Electrical Safety Manual, Chapter 2 "General Safety Requirements," "2.2 Qualifications and Training"
8. (QUESTION 6d(1)) MN471004 - Electrical Safety Manual, Chapter 4, "Research and Development-Specific Requirements," "4.3 Safe Work Practices"
9. (QUESTION 7a) MN471001 - ES&H Manual, Section 4N, "Industrial Machine and Portable Power Tool Safety"
10. (QUESTION 7b) MN471001 - ES&H Manual, Section 4N, "Industrial Machine and Portable Power Tool Safety"
11. (QUESTION 10a) MN471000 - Pressure Safety Manual, Chapter 2, "The Pressure Safety Program"
12. (QUESTION 10d) MN471000 - Pressure Safety Manual, Chapter 9, "Documenting the Operational Safety of Pressure Systems"
13. (QUESTION 10e) MN471000 - Pressure Safety Manual, Chapter 9, "Documenting the Operational Safety of Pressure Systems"
14. (QUESTION 10f) MN471000 - Pressure Safety Manual, Chapter 6, "Testing and Evaluating Pressure Systems"
15. (QUESTION 10f) MN471000 - Pressure Safety Manual, Chapter 7, "Verifying the Safe Operation of Pressure Systems"
16. (QUESTION 10f) MN471000 - Pressure Safety Manual, Chapter 8, "Servicing Pressure Vessels and Components"
17. (QUESTION 15a) MN471001 - ES&H Manual, Section 10H, "Discharges to the Sanitary Sewer System"
18. (QUESTION 15a(1)) MN471001 - ES&H Manual, Section 10H, "Discharges to the Sanitary Sewer System"
19. (QUESTION 15b) MN471001 - ES&H Manual, Chapter 17, "Air Emissions"
20. (QUESTION 15b(3)) MN471001 - ES&H Manual, Chapter 17, "Air Emissions"
21. (QUESTION 15d) MN471001 - ES&H Manual, Section 19A, "Hazardous Waste Management" (all locations other than SNL/CA)
22. (QUESTION 15d) MN471001, ES&H Manual, Chapter 20, "Waste Management at SNL/CA" (SNL/CA only)
23. (QUESTION C1) Corporate Procedure: ESH100.2.IH.15, "Control Hazards Using Local Exhaust Ventilation and High Efficiency Particulate Air Filters"
24. (QUESTION C2) MN471001, ES&H Manual, Section 4L, "Personal Protective Equipment (PPE)," "General Requirements for Personal Protective Equipment (PPE)"
25. (QUESTION C2a) MN471001, ES&H Manual, Section 4L, "Personal Protective Equipment (PPE)," "General Requirements for Personal Protective Equipment (PPE)"
26. (QUESTION C2a) MN471001 - ES&H Manual, Section 6C, "Respiratory Protection"
27. (QUESTION C4) MN471001 - ES&H Manual, Section 10B, "National Environmental Policy Acy (NEPA), Cultural Resources, and Historic Properties"

28. (Required by general corporate business process) MN471001 - ES&H Manual, Section 4B, "Electrical Safety Practices"
29. (Required by general corporate business process) MN471001 - ES&H Manual, Section 4K, "Traffic Safety"
30. (Required by general corporate business process) MN471001, ES&H Manual, Section 21, "Technical Work Documents (TWDs)"

VII. Related Documents

NEPA Documents	Number	Project End Date
CINT room 1511 - Integration Lab Parts Clean room	SNA08-0179	

Other Documents	Number	Type	Published Date
Standard Operating Procedure for Working with Hazardous and Particularly Hazardous Chemicals in Center 1100 Laboratories	SOP1100.001 Issue D	SOP	07/23/2008

Permits	Number	Type	End Date
CINT's Authority-to-Construct Permit No. 1725 Actual Date of Initial Start-up	No. 1725	Air	10/11/2004
City of Albuquerque - Wastewater Discharge Permit for CINT	2238A	Water	01/04/2007

VIII. Primary Hazard Screening Worksheets

Version of Questions:**I**

Operation Type:**Facility or Lab**

Interview Worksheet:

	Questions	Answers
1	**Radiation-Generating Devices (RGDs):** Is there a radiation-generating device (RGD)? (Answer this question "no" if the RGDs are registered in storage.)	No
2	**Radioactive Materials:** Is radioactive material present?	No
3	**Explosives and Ammunition:** Are any explosives or ammunition (including explosive waste) managed, handled, processed, used, or stored?	No
4	**Lasers:** Do the activities covered by this PHS involve Regulated Laser Activities?	No
5	**Chemicals:** ***(Review the Help text before answering this question.)*** Do the activities involve chemicals?	Yes
5a	Has the Industrial Hygiene Program performed an exposure assessment of all of the current activities involving chemicals covered by this PHS?	No
5b	Do any of the activities include? - Cleanup operations at hazardous waste sites (e.g., environmental restoration [ER] sites - Hazardous waste operations at treatment, storage, and disposal (TSD) facilities - Emergency response or post-emergency response	No
5c	Will activities have, use, synthesize, or liberate unbound engineered nanoscale particles (UNP)?	No
5d	***(Review the help text before answering this question.)*** Do the activities involve storage or utilization of simple asphyxiants?	No
5e	Are the hazardous chemicals, hazardous substances, or hazardous waste involved in these activities considered corrosive materials?	No
5f	Do these activities involve the use of hydrofluoric acid?	No
5g	Do chemicals used in the activities meet or exceed the Operational Permit Amounts for hazardous materials listed in the International Fire Code (IFC) and National Fire Protection Association (NFPA) Guidance? **(Please see IFC 105.6.20 Table 25-1 in the Help file for SNL Fire Protection's implementation requirements.)**	No
5h	Do the activities involve the storage, dispensing, or use of flammable or combustible liquids?	Yes

	Questions	Answers
5i	Do activities involve any of the following? - Flammable chemicals in quantities greater than 5 liters of liquid, 1 kg of solid, or 500 cubic feet of gas (at STP) in any single container or manifolded series of containers - Equipment connected to a house system for flammable gases - Reactive chemicals in quantities greater than 1 liter of liquid, 100 g of solid, or 500 cubic feet of gas in any single container or manifolded series of containers - Oxidizers, other than nitric acid, in quantities greater than 5 liters of liquid, 1 kg of solid, or 500 cubic feet of gas in any single container or process - Pyrophoric chemicals in total quantities greater than 500g - Metal powders in quantities greater than 1 kg	No
5j	Do the activities include a process that involves highly hazardous chemicals at or above twenty-five percent of the Process Safety Management standard threshold quantities, or are there flammable liquids or gases involved in a process in a quantity of greater than 2,500 pounds?	No
5k	Do activities use or store toxic gases in quantities greater than the de minimus quantities listed in the Help file?	No
5l	***(Refer to help file to determine if quantities have been exceeded.)*** Do the activities use or store hazardous chemicals in quantities equal to or greater than the **Emergency Management screening threshold** quantities?	No
6	**Electrical:** Do workers conduct any of the following tasks? - Work on or near (within the limited approach boundary - 3.5 feet) exposed and energized (greater than or equal to 50 volts) electrical circuits or contact energized electrical circuit parts with tools or test probes? - Operate circuit breakers or disconnect switches operating at or above 50 Volts and 5 mA or more? - Perform non electrical work, but might contact exposed and energized electrical circuits - *operating at 50 volts or greater* - with equipment or materials, such as ladders, cranes, paint roller extensions, or forklifts? - Use Equipment that **operates at 50 Volts or more** and is **not listed** by an OSHA approved Nationally Recognized Testing Laboratory (e.g., UL) and operating at over 50 Volts, including extension cords or power strips?	Yes
6a	Do workers work on or near **(within the limited approach boundary - 3.5 feet)** exposed and **(greater than or equal to 50 volts)** energized electrical circuits or contact energized electrical circuit parts with tools or test probes?	Yes
6a(1)	Are **circuit parts** storing 10 Joules or more, associated with **Marx generators or pulsed power circuits**?	No
6a(2)	Are **circuit parts** associated with **facility** type **electrical distribution systems**?	No
6b	Do workers operate **circuit breakers** or **disconnect switches** operating at **50 Volts or more** and **5 mA or more**?	Yes
6c	Do workers **perform non electrical work,** but **might contact exposed and energized electrical circuits** - ***operating at 50 volts or more*** - with equipment or materials, such as ladders, cranes, paint-roller extensions, or forklifts?	No
6d	Do workers **use equipment** that operates at 50 Volts or more and is **not listed** by an OSHA-approved Nationally Recognized Testing Laboratory (e.g., UL), including extension cords and power strips?	Yes
6d(1)	Have all of the non-NRTL-approved electrical equipment or appliances been approved and documented using the Sandia non-NRTL-evaluation process?	No

	Questions	Answers
7	**Mechanical:** Does the facility or activity involve any of the following hazards or activities? - machine shop equipment - portable power tools - powder-actuated tools - centrifuge operations - forklifts - motorized hand trucks - cranes/hoists, miscellaneous lifting devices, - industrial robots or industrial robotic systems - operate light or heavy earth-moving equipment - excavations - trenches - floor or wall penetrations - stored or kinetic mechanical energy that could cause an injury during normal working conditions	Yes
7a	Do workers operate machine shop equipment?	No
7b	Do workers operate portable power tools?	Yes
7c	Do workers operate powder-actuated tools (also known as explosive-actuated fastening tools)?	No
7d	Does this facility or project activity use centrifuges?	No
7e	Are forklifts used in any operations?	No
7f	Are motorized hand trucks used in any operations?	No
7g	Are overhead cranes/hoists, mobile cranes, miscellaneous lifting devices (shop or gantry crane), or rigging used in any operations?	No
7h	Are industrial robots or industrial robotic systems used in this project or activity?	No
7i	Do workers operate light or heavy earth-moving equipment?	No
7j	Do workers perform or come into close proximity to any of these activities: - Excavations - Trenches - Floor or Wall Penetrations	No
7k	Do activities involve stored or kinetic mechanical energy that could cause an injury under normal working conditions?	No
8	**Nonionizing Radiation:** At any time, do activities produce nonionizing radiation (NIR) (excluding lasers)?	No
9	**Thermal:** Do thermal hazards or thermal stressors exist in the work area?	No
10	**Pressure:** Are workers involved in the design, installation, operation, or maintenance of a pressure system (including pressure, vacuum, cryogenic fluid applications)?	Yes
10a	Do personnel function as pressure system operators?	Yes
10b	Do personnel function as a pressure installers?	No

	Questions	Answers
10c	Do personnel handle cryogenic fluids, or design, install, or operate cryogenic fluid-handling systems?	No
10d	Does an up-to-date data package or Pressure Safety Analysis Report, reflecting current personnel and system configuration, exist for all systems?	Yes
10e	Do supplier-established pressure ratings exist for all systems and system components?	Yes
10f	Are pressure system (or component) reevaluations being performed according to the requirements of the Pressure Safety Manual? (A common example would be the replacement or retesting of pressure relief valves.)	Yes
11	**Noise:** At any time, do activities produce potentially high noise levels? - Noise that would require you to raise your voice to be heard by another person three feet away (greater than 85 decibels) (potential sources include: compressors, shredders, heavy machinery, saws, grinders, pumps, etc.) - High impulse/impact noise (potential sources include: explosions, gunshots, jackhammers, pressure releases, etc.) - Ultrasound noise (potential sources include: ultrasonic welders, ultrasonic cleaners, and turbo-pumps, fluid flow, etc.)	No
12	**Miscellaneous Hazards:** Does the facility or activity involve any of the following hazards or activities? - Ergonomic or musculosketal stressors - Construction-like activities - Work around asbestos - Ladders - Elevated surfaces (other than ladders) - Commercial underwater diving - animals and hazardous Plants - Aircraft - Airborne objects (other than aircraft) - Firearms - Use of human subjects - Use of Sealed Drums	No
13	**Outside of Manufacturer's Recommendations:** Does this work involve the use of **equipment, tools, or materials** outside of their design specifications or outside of the manufacturer's recommendations? (See Help Text for examples). Please enter each item into the hazard table.	No
14	**Non-Commercial Hazards:** Does this work involve the use of noncommercial equipment or apparatus (excluding robots, robotics systems, and equipment where the only hazard is a pressure system that has a pressure safety data package)? Please **enter each** noncommercial piece of equipment into the hazard table.	No
15	**Environmental Concerns:** Are there any potential **environmental concerns** with this activity that align with the SNL Environmental Management System (EMS) aspects, such as chemical use, fuel or oil storage, waste generation (except sanitary trash), construction activities, disturbance to habitat or protected species, or discharges to the air, ground surface, ground water, or the sewer systems?	Yes

Environmental Concerns Hazards		
Source Name	**Type**	**Est. Quantity**
Solvent Waste (Liquids)	Hazardous Waste	10 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: Solvent Bench Comments: All solvent waste generated in 1511 will be collected in a single (4.5) gallon carboy that is integrated into the solvent bench. Once the carboy becomes full, the waste product will be transfered to a disposable (5) gallon container for processing through Sandia's hazardous waste handling system.	
Base Waste (Liquids)	Hazardous Waste	4 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: Base Bench Comments: Comments: Base waste generated in 1511 will be introduced in small (<200 ml) or moderate(up to 3 Liters) quantities to the facility's AWN (Acid Waste Neutralization)System for treatment. The AWN system is designed to process both acid and base waste streams.	
Solvent Waste (Solids)	Hazardous Waste	10 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: Solvent Bench Comments: Solid waste with solvent residue from processing operations. This waste will mostly consist of cleanroom wipes, however pippet syringes, small containers and other solvent contaminated materials may also be introduced to this waste stream. Waste material will be collected in a single properly marked waste cans waste and processed through Sandia's hazardous waste handling system.	
Base Waste (Solid)	Hazardous Waste	10 kg/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: Base Bench Comments: Solid waste with basic residues from processing operations. This waste may consist of cleanroom wipes, cleaning pads and other base contaminated materials. Waste material is collected in a single properly marked waste can and subsequently processed through Sandia's hazardous waste handling system.	

	Questions	Answers
15a	**Wastewater:** Are there any wastewater discharges in this activity?	Yes
15a(1)	**General Discharges:** Are the wastewater discharges of a general nature, such as the washing and rinsing of laboratory glassware and/or process components?	Yes
15a(2)	**Categorical Processes:** Are the wastewater discharges from a categorical process or does the activity contain a zero discharge categorical process?	No
15a(3)	Will this activity use more than 1,000 gallons of water per day?	No
15b	**Air:** Are there any air discharges or emissions at this activity?	Yes
15b(1)	**Ozone Depleting Substance (ODS):** Are there any **ODSs** at this activity?	No
15b(2)	Will this activity include the installation and or use of **combustion equipment**? Combustion equipment includes boilers and internal combustion engines, such as generators.	No
15b(3)	Will this activity include the use of chemicals that could be Clean Air Act Regulated?	Yes
15b(4)	Will this activity involve open-burn activities?	No
15b(5)	Will this activity involve **soil disturbance, building demolition,** or **construction** that **disturbs soil,**, including access roads and staging areas?	No
15b(6)	**Radionuclide NESHAP:** Are there any **radionuclide air discharges** or use of radionuclides in gaseous form or at elevated temperatures at this activity?	No
15c	**Radioactive Waste:** Will this activity generate any radioactive waste, or will Members of the Workforce be required to handle radioactive waste?	No

	Questions	Answers
15d	**Hazardous Waste:** Will this activity generate any hazardous waste, or will Members of the Workforce be required to handle hazardous waste?	Yes
15d(1)	**Less-Than-90-Day Accumulation Area:** Will this activity store any hazardous waste in a **less-than-90-day accumulation area**?	No
15d(2)	**Acutely Hazardous Waste:** Will this activity generate any **acutely hazardous waste**?	No
15d(3)	**Waste Containing Mercury:** Will this activity generate any **waste containing mercury** (e.g., switches, thermometers, manometers, elemental mercury (Hg), or mercury compounds [e.g., mercuric oxide (HgO)], etc,)?	No
15e	**Mixed Waste:** Will this activity generate any **mixed waste**, or will Members of the Workforce be required to manage mixed waste?	No
15f	**Infectious / Biohazardous Waste:** Will this activity generate any infectious or biohazardous waste, or will Members of the Workforce be required to handle infectious or biohazardous waste?	No
15g	**Radioactive Contamination:** Will this activity be conducted in an area for which a reasonable potential exists for introducing **radioactive contamination** or causing activation of material that may become waste?	No
15h	**Material or Waste of Unknown Origin:** Will this activity require handling material or waste of unknown origin?	No
15i	**Fuels and Oil Storage:** Does this activity use a fuel or oil storage container capable of containing 55 gallons or more?	No
15j	**Discharges to Ground Surface:** Does this activity have a potential for any **discharges to the ground surface**?	No
15k	**Improvements/modifications to structure/building exteriors and landscaping:** Will this project involve activities that require modifications to the exteriors of structures and buildings or modification to existing landscape, including removal of vegetation?	No
15l	**Disturbance to habitat or protected species**: Will this project involve activities that will disturb habitat or protected species, including wildlife management and outdoor projects or testing activities?	No
16	**Packaging and Transportation of Hazardous Materials:** Will any activities covered by this PHS involve the packaging and transportation of hazardous material (including explosives or radioactive material)?	No
17	**Fire Protection Concerns:** Will the activity include any of the following? - Members of the Workforce modifying in any way any fire suppression or life safety system (fire rated walls, fire doors, fire sprinklers, fire alarm devices, fire extinguishers, or means of egress)? - Members of the Workforce performing hot work in association with this facility or project activity?	No
18	**Biological Materials:** *(see Help text before answering this question.)* Do activities involve the use of or potential exposure to biological materials?	No
19	**Confined Spaces:** Are confined spaces present in the work area?	No

	Questions	Answers
20	**Beryllium:** Do operations include any activities that? *(Review the Help text before answering this question)* - Use or handle beryllium, beryllium-containing alloys or beryllium oxides? - Create or work with **beryllium ceramics**? - Handle waste potentially-contaminated with beryllium or waste containing beryllium? - Perform **decontamination** of beryllium contamination? - Entail work in a beryllium contaminated building or area? - Apply abrasive or destructive methods to metal objects, articles, weapon components or bar stock, potentially containing beryllium? - Use non sparking tools containing beryllium?	No
21	**Other Hazards:** Are there any: - Hazards that have **not been adequately addressed** in other questions. (e.g., polar bears, foreign travel, specific chemical hazards, natural hazards [e.g., wind, excessive water, radon, or overhead trees]), **or** - Hazards of **unknown magnitude** (e.g., emergency response, hazards encountered by roving personnel) **Enter all of these hazards in the User- Specified Hazards table.** Enter "**Low**" as the **Hazard Classification** for hazards of unknown magnitude, unless the Safety Basis Department has determined otherwise.	No

Controls Worksheet:

	Questions	Answers
C1	**Local Exhaust Ventilation:** Do the activities covered by this PHS use local exhaust ventilation (LEV) (e.g., laboratory hoods, glove boxes, downdraft tables, "elephant trunks," canopy hoods, paint booths, slot ventilation, portable welding ventilation, etc.)?	Yes
C2	**Personal Protective Equipment:** Are hazards (e.g., chemicals radiological, electrical, mechanical, thermal, flying particles and/or falling or rolling objects) encountered that are capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact?	Yes
C2a	Has a workplace hazard assessment been performed for the activities covered by this PHS?	No
C3	**Control of Hazardous Energy (LOTO):** Do you have **any equipment** in your operations that requires any of the following activities? - Construction - Installation - Setup - Adjustment - Inspection - Modification - Maintenance - Service - Lubrication - Cleaning - Unjamming - Making adjustments or tool changes	No
C4	**NEPA Compliance:** Has this project or activity been reviewed for National Environmental Policy Act (NEPA) compliance?	Yes
C4a	Are all relevant NEPA documents listed in the Documents section of this PHS?	Yes

IX. Hazard Analysis (HA) Section

Hazard Analysis

Source Name or Question: **Question 5a**
Source Reason: **Unevaluated chemical use**
Hazardous Condition: **potential chemical overexposure**

PHS Identified 'Low' Hazard.

Author's Comment:

Cause: Human Error

Personnel drop a chemical bottle in during operations in the laboratory.

Consequence: Minor Illness/Injury

Personnel can be exposed to chemical vapors and/or dermal contact.

Mitigation: Procedural/TWD (SOP/OP/RWP)-Other

Doc Id: SOP1100.001 Issue D **Title: Standard Operating Procedure for Working with Hazardous and Particularly Hazardous Chemicals in Center 1100 Laboratories**

Mitigation: Training-Other

Course Id: LAB103 **Title:** SITE-SPECIFIC LABORATORY SAFETY TRAINING

Mitigation: Personal Protective Equipment-Other

Personnel wear gloves, safety glasses when using chemicals.

Author Assessment: Applied Mitigation and Prevention are sufficient.

Training, the SOP and the PPE worn during chemical usage are deemed adequate.

Source Name or Question: **Question 102a**
Source Reason: **Unevaluated hazards**
Hazardous Condition: **hazards that may require PPE**

PHS Identified 'Low' Hazard.

Author's Comment:

Cause: Human Error

Personnel spill chemicals during operations.

Consequence: Minor Illness/Injury

Personnel are exposed via inhalation and/or skin contact.

Mitigation: Personal Protective Equipment-Other

Personnel wear gloves and safety glasses when working with chemicals.

Mitigation: Procedural/TWD (SOP/OP/RWP)-Other

Doc Id: SOP1100.001 Issue D **Title: Standard Operating Procedure for Working with Hazardous and Particularly Hazardous Chemicals in Center 1100 Laboratories**

Mitigation: Training-Other

Course Id: LAB103 **Title:** SITE-SPECIFIC LABORATORY SAFETY TRAINING

Personnel are trained on equipment and the usage of chemicals associated with the equipment/operation.

Author Assessment: Applied Mitigation and Prevention are sufficient.

The Standard Operating Procedure, personal protective equipment used and the training are deemed adequate for this hazard.

Source Name or Question: **Question 6d(1)**
Source Reason: **Electrical equipment operating at 50V or greater that is not NRTL-approved**
Hazardous Condition: **Electrocution/Arcs/Fires**

PHS Identified 'Low' Hazard.

Author's Comment:

Cause: System/Component/Equipment Failure

Short circuit to neutral or ground.

Consequence: Minor Mission Disruption/Delay

Loss of power to tool and subsequent shut down.

Mitigation: Active Engineering Control-Other

Properly sized circuit breaker or fuse to open circuit in the event of an overcurrent situation.

Mitigation: Passive Engineering Control-Other

Components and wiring appropriately sized to operate well above the trip point of the overcurrent protection devices.

Author Assessment: Applied Mitigation and Prevention are sufficient.

Preventions/mitigations follow typical NEC guidelines and industry standards.

Consequence: Death [Worker]

Electrocution if the worker should provide a low impedance path through the central nervous system or heart to ground.

Mitigation: Active Engineering Control-Other

Incorporation of UL approved ground fault interrupt circuit protection to outlets within 6' of water soures.

Mitigation: Passive Engineering Control-Access Prevention Barrier (locked door/gate)

Panels with exposed terminals are not easily accessible and require a tool for removal.

Mitigation: Procedural (Monitoring etc.)-Other

Ground fault interupters are tested for proper operation on a routine basis.

Author Assessment: Applied Mitigation and Prevention are sufficient.

Preventions and mitigations described above follow guidlines established by the NEC and are considered to be normal measures to protect against accidental electrocution.

Consequence: Minor Property Damage

Bench or work station fire.

Mitigation: Passive Engineering Control-Other

Work surfaces and immediate areas surrounding the work surfaces are constructed of metal or in the case of the wet sinks UL 94V-0 rated materials. If a fire were to start, the flame would slowly propagate or completely extinguish. However some of the older benches have areas surrounding the work surface that is constructed of UL 94V-2 materials. A fire extinguishers is located in the general vacinity of the UL 94V-2 constructed bench for added protection.

Mitigation: Passive Engineering Control-Fire Barrier (fire wall/door/coating)

Electrical components and power distribution circuits in the newer wet banches are enclused in an all metal enclosure. In the older bench, the electrical componenets are mounted on an aluminum back plate to prevent the spread of fire. Wiring that travels outside of the electrical enclosure is contained within UL approved PVC liquid tight flexible conduits and components.

Mitigation: Passive Engineering Control-Other

Explosion proof hot plates are used on the work surfaces where flammable materials may be present to prevent sources of ignition in the presents of flammable vapors.

Author Assessment: Applied Mitigation and Prevention are sufficient.

Components and materials of construction follow industry standards that prevent the spread of fire.

Note: 15 hazard analysis(es) were not reported, because no (optional) hazard analysis was performed for them.

X. Supplemental Information

PHS Input

Notes from Interview Questions

Notes from Controls Questions

User Entered Hazard Tables

Environmental Concerns Hazards		
Source Name	**Type**	**Est. Quantity**
Solvent Waste (Liquids)	Hazardous Waste	10 gal/yr
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1511 Location Details: Solvent Bench Comments: All solvent waste generated in 1511 will be collected in a single (4.5) gallon carboy that is integrated into the solvent bench. Once the carboy becomes full, the waste product will be transfered to a disposable (5) gallon container for processing through Sandia's hazardous waste handling system.	
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PHS Output - Results and Conclusions

Major Safety Concerns

The hazard classification is: **Low**

The required documentation is: **PHS with integral HA**

The hazard classification is: Low since this Facility or Lab involves:
(QUESTION 5a) potential chemical overexposure
(QUESTION 6d(1)) unknown hazard potential since items have not gone through the standards, testing rigor, and hazard analysis associated with an NRTL-evaluation
(QUESTION C2a) hazards that may require PPE
****

Other Safety Concerns (potential hazard sources) for this Facility or Lab

(Required by general corporate business process) traffic related hazards for injury
(Required by general corporate business process) common electrical hazards
(QUESTION 5) Potential personnel exposure to chemicals & fire protection regulatory requirements
(QUESTION 5h) fire/explosion hazard
(QUESTION 6a) potential electrical shock or arc
(QUESTION 6b) potential electrical arc from operating circuit breakers or disconnect switches
(QUESTION 7) potential injury from mechanical forces
(QUESTION 7b) potential injury from portable power tools
(QUESTION 10) Injury or damage
(QUESTION 15) potential for regulatory action
(QUESTION 15a) potential to exceed permitted amounts
(QUESTION 15a(1)) potential to exceed permitted amounts
(QUESTION 15b) potential to emit regulated contaminants
(QUESTION 15b(3)) potential to emit regulated contaminants
(QUESTION 15d) potential for regulatory action
****

Required Training

[Note: This training is a regulatory requirement for one or more people involved in operations associated with identified hazards. Each class may not be required by all people working in the area.] Please note that some training classes are only provided occasionally. Please be sure to allow adequate lead-time for personnel to schedule and complete training.]

NONE

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Results Based On Answers

The results in this PHS were based on the following answers to interview questions:
Q 0 answered: Y; Q 5 answered: Y; Q 5a answered: N; Q 5h answered: Y; Q 6a answered: Y; Q 6a(2) answered: N; Q 6b answered: Y; Q 6d(1) answered: N; Q 7 answered: Y; Q 7a answered: N; Q 7b answered: Y; Q 10 answered: Y; Q 10a answered: Y; Q 10d answered: Y; Q 10e answered: Y; Q 10f answered: Y; Q 15 answered: Y; Q 15a answered: Y; Q 15a(1) answered: Y; Q 15b answered: Y; Q 15b(3) answered: Y; Q 15d answered: Y;

****

Interquestion Dependency Concerns for this Facility or Lab document:

(none)

XI. EOC Concerns

Chemical; Energized Electrical; Energized Mechanical; Environmental Concerns; Pressure